

Highlights

Sales of Fuel Oil and Kerosene in 2003

Economic growth, a winter much colder than normal coupled with fuel switching, combined to propel distillate sales to a new record high reversing the unusual drop in sales recorded during 2002. Sales in a number of oil consuming sectors registered sharp increases that combined to increase total distillate sales by more than four billion gallons to 63.9 billion gallons and increase of 7.6 percent. The total exceeded the previous record of 59.9 billion gallons set in 2001 by 3.9 billion gallons.

Spurred by very harsh winter conditions and by record high natural gas prices, sales of residual fuel oil surged in 2003. Overall sales of residual fuel oil increased by more than one billion gallons or 10.1 percent, the largest year-to-year increase in sales since 1998. The increase in sales reversed the downturn recorded in 2002 when neither winter weather nor fuel prices supported fuel switching to offset the long-term trend of declining sales of heavy fuel oil. The situation was very different in 2003 with both high natural gas prices and weather conditions pushing fuel switching to oil on a large scale. Sales of kerosene also increased sharply, recovering much of the volume lost in 2002.

The large increase in distillate sales, combined with sizable increases in sales of residual fuel oil and kerosene, resulted in a new record for combined fuel oil sales of 76.1 billion gallons, more than 1.5 billion gallons above the previous record set in 2001. Despite the sharp increase in distillate sales, they accounted for a somewhat smaller share of the overall fuel oil market in 2003 than in 2002. Distillate sales accounted for 83.9 percent of total sales compared to 84.3 percent in 2002. Sales of residual fuel oil accounted for 15.0 percent up from 14.7 percent in 2002 and sales of kerosene accounted for the remaining 1.1 percent compared to 0.9 percent of total sales in 2002.¹

Distillate Fuel Oil

Distillate sales in 2003 surged to 63.9 billion gallons, an all-time high, 3.9 billion gallons above the previous record set in 2001. The increase of 4.5 billion gallons more than made up for the loss recorded in 2002 and exceeded the average increase of the previous decade by nearly three and a half times. It should be noted that the drop in distillate sales in 2002 was the first in

Table HL1. Volume Distribution of Distillate and Residual Fuel Oils, 2002 and 2003

Energy Use	Distillate 2003		Distillate 2002		Residual 2003		Residual 2002	
	Volume (million gallons)	Percent Share	Volume (million gallons)	Percent Share	Volume (million gallons)	Percent Share	Volume (million gallons)	Percent Share
Residential	6,927	10.8	6,377	10.7	—	—	—	—
Commercial	3,687	5.8	3,293	5.5	756	6.6	572	5.5
Industrial	2,394	3.7	2,384	4.0	1,414	12.4	1,251	12.1
Oil Company	514	0.8	771	1.3	84	0.7	109	1.1
Farm	3,201	5.0	3,418	5.8	—	—	—	—
Electric Power	1,148	1.8	751	1.3	5,273	46.2	3,575	34.5
Railroad	3,657	5.7	3,245	5.5	—	—	—	—
Vessel Bunkering	2,217	3.5	2,079	3.5	3,874	34.0	4,848	46.8
On-Highway	37,104	58.1	34,309	57.8	—	—	—	—
Military	416	0.7	357	0.6	10	0.1	4	0.0
Off-Highway	2,592	4.1	2,358	4.0	—	—	—	—
Other	0	0.0	0	0.0	2	0.0	3	0.0
Total	63,855		59,343		11,413		10,362	

Notes: Totals may not equal sum of components due to independent rounding.

Sources: Energy Information Administration Form EIA-821, "Annual Fuel Oil and Kerosene Sales Report," for 1999-2003. On-Highway Diesel data are Federal Highway Administration statistics of highway special fuels use.

¹ Numbers may not sum to 100 percent due to rounding.

more than a decade, and resulted from a combination of weather conditions, the state of the economy, and the unusual circumstances brought about in the aftermath of the terrorist attacks of September 2001. Further, even though distillate sales went up in 2001, the magnitude of that increase was the smallest of the previous decade, representing only about one-fifth of the average increase of the previous 10 years. When those factors are considered, neither the increase of 4.5 billion gallons, nor the total of 63.9 billion gallons for 2003 is necessarily remarkable. In fact, considering the average increase from 1991 through 2000, had that trend continued uninterrupted through 2003, total distillate sales of approximately 64 billion gallons could have been expected.²

In 2003, a number of factors contributed to the upturn in distillate sales. *First*, and by far the most significant influence on sales was the increase in sales to the transportation sector. Total sales of distillate for railroad, vessel bunkering, and on-highway use increased by approximately 3.3 billion gallons (8.4 percent).

Second, economic conditions generally continued to improve from the downturn experienced in 2001. In 2003, despite rising energy prices, sales improved in most sectors of the market when compared to 2002. Gross Domestic Product (GDP), a prime measure of the state of the economy, increased by 3.1 percent in constant dollars, well above the gain of 2.2 percent registered for 2002. Unlike 2002 when industrial production fell by 0.54 percent, overall industrial production increased slightly in 2003, up by 0.2 percent. Nonetheless the high cost of fuel, especially for natural gas, contributed to a drop in the production of non-durable goods of 2.2 percent and a drop in industrial utilization of 1.06 percent. Overall expenditures for new construction increased by 4.3 percent, compared to an increase of 0.97 percent last year. In addition, although expenditures for new construction in the commercial and industrial sectors fell again, the drop was smaller than that in 2002, 8.4 percent for 2003, compared to a drop of 23.4 percent in 2002.

In addition, although total energy consumption in the United States increased during 2003, the amount of the increase was slight, only about 0.2 quads compared to an increase of 1.6 quads for 2002. Despite the small

increase in energy use total energy consumption of 98.2 quads was second only to the 98.9 quads consumed in 2000.³

Despite a generally improved economic situation for the country, unemployment remained a problem, increasing slightly from 5.8 to 6.0 percent. However, the increase in 2003 was considerably smaller than was the case in 2002 when the unemployment rate jumped from 4.7 to 5.8 percent.⁴

Third, weather played a significant role in stimulating distillate demand in 2003. Although the overall increase in the number of heating degree days in 2003 was just 4.1 percent for the nation as a whole, when examined on a regional basis the differences are far more pronounced, particularly in the principal fuel oil consuming sections of the country (New England, Central Atlantic and East North Central) where heating oil demand for both residential and commercial consumers is the greatest. During the winter of 2003 the weather was sharply colder than during 2002 in New England and the Middle Atlantic, 12.3 and 17.1 percent respectively. The sharply colder winter in the northeast was sufficient to push the heating degree total for all three regions above the normal or average for the respective regions for several years. Nationally, residential heating oil sales increased by 550 million gallons or 8.6 percent to 6.9 billion gallons, the highest level since 1994.

Higher fuel prices also impacted distillate sales. Although fuel prices in general moved higher in 2003, the differential between natural gas and fuel oil was sufficient to lead many commercial, industrial, and utility end users, who had the option, to switch from gas to oil when the opportunity was presented.⁵ Fuel switching boosted sales of both distillate and residual fuel oil. (For details on the impact of high natural gas prices on sales of residual fuel oil please see the residual fuel oil section below.) Sales of distillate to the commercial sector increased by 393 million gallons or 11.9 percent.

Sales for electric generation also increased considerably over the previous year as electric power generators attempted to meet increased demand in both winter and summer by running peaking units to meet incremental demand at critical times for short periods of time.⁶ Such units are used in the winter when it is very

² The average increase during the period 1991-2001 was 1.47 billion gallons. Distillate sales increased by more than 2.0 billion gallons in both 1999 and 2000.

³ One quad equals one quadrillion (a one followed by fifteen zeros) British thermal units (Btu), source EIA, MER May 2003, Table 2.1

⁴ *Economic Indicators*, September 2003, Washington D.C. U.S. government Printing Office, p 12. (Data are adjusted for inflation using 1996 as the base).

⁵ Generally, those having fuel switching capability switch only if market conditions appear to be favorable for a prolonged period of some weeks, fuel switching does not typically occur if the window of opportunity appears likely to last only for several days.

⁶ Smaller peaking units, especially older units are often combustion turbines (in some cases converted jet turbine engines that run on No 2 fuel oil).

cold, periods when interruptible contract provisions are triggered and some users of natural gas must switch to alternatives. It is also not unusual for distillate fuel to be used in such peaking units during the summer to meet peak cooling demand. In 2003, harsh winter conditions boosted demand for home heating, however, the summer of 2003 while remaining somewhat warmer than a normal year, was considerably cooler, particularly in the Middle Atlantic and East North Central regions and to a lesser extent in Northeast region of the country. Nonetheless, in 2003, as already high natural gas prices increased sharply during the summer, the volume of fuel oil (both distillate and residual) used to generate electricity increased sharply and that increase was mirrored by a corresponding drop in the use of natural gas used for that purpose. Thus, some of the increase in the use of distillate was brought about by increased reliance on peaking units run not so much to meet summer cooling demand but to save money.

The transportation sector once again accounted for the largest gains in sales of distillate fuels. Sales to each segment in the transportation sector increased significantly. Bunker sales, the smallest transportation segment increased by 138.0 million gallons (6.6 percent), sales to railroads increased by 411.1 million gallons and sales of on-highway diesel fuel increased by 2.8 billion gallons (8.2 percent). The increase in the combined sales of distillate to the transportation sector totaled more than 3.3 billion gallons and more than 74 percent of the overall increase in total distillate fuel oil sales.

In 2003, influenced by adverse weather conditions coupled with higher fuel prices, the number of acres harvested for most major crops including soybeans, corn, and vegetables was essentially unchanged or down slightly from 2002. The only large-scale change among the major crops took place in the number of acres of wheat that were harvested during 2002. In 2002 wheat was harvested from 45.8 million acres in 2003 the number jumped to 52.8 million acres an increase of 15 percent.⁷ However, the increase should be measured against the crops of 2001 and 2002 that were the smallest in decades. The summer of 2003 in the west and especially in California was much hotter than during 2002 and also much hotter than normal. This had a correspondingly negative impact on agriculture production in California, the leading agricultural state. For example, the volume of crushed grapes (used in the

production of wine) declined by 11 percent.⁸ Overall for the United States, sales of distillate to the agricultural sector fell by 218 million gallons, 6.4 percent.

As low interest rates remained in effect throughout the year, the number of new housing units surged, increasing by 14.1 percent, helping to boost distillate sales to the off-highway construction market by 233.9 million gallons, 9.9 percent. Although the increase was offset to some degree by a drop of 8.40 in new construction in the commercial and industrial sectors, the decline was considerably smaller than the drop of more than 23.3 percent that occurred the previous year.⁹

A number of factors including the lingering effects of the credit crunch impacted the energy sector during 2003 and resulted in a reduction of distillate fuel used directly by oil companies. With the credit crunch many companies reduced spending during 2002. In 2003, despite generally higher commodity prices, many companies were reluctant especially early in the year to boost spending to seek out new fields. Instead, companies emphasized debt reduction and maximizing profits. To achieve the first objective, companies (often the multinational majors or other large companies) divested less valued assets; often mature fields in the United States. To achieve the second, the companies tended to emphasize exploration in those areas where the returns could be gained the quickest and for the lowest possible investment. Consequently, even later in the year when companies announced increased exploration efforts, they tended to concentrate efforts outside of North America. Further, a prolonged strike in Venezuela and unrest in Nigeria that led major companies to declare force majeure reduced crude imports for several weeks early in the year. Later in the year the unusually high prices for natural gas led some producers to reduce gas processing leaving in more natural gas liquids than normal; this not only impacted gas processing fuel needs but also impacted petrochemical operations. In 2003 sales of distillate for oil company use fell by 259.1 million gallons (33.5 percent).

On a regional basis, the colder winter weather helped to boost sales of distillate for residential use in PAD District 1¹⁰ (East Coast), in PAD District 2 (Midwest) and in PAD District 4 (Rocky Mountain). In PAD District 1, sales increased by 240.2 million gallons in PAD District 1A (New England), by 262.9 in PAD District 1B (Central Atlantic), and by 31.7 million gallons in

⁷ Department of Agriculture, National Agricultural Statistics Service.

⁸ California Agricultural Statistics Service, *Preliminary Grape Crush Report For 2003*, Release Number: CDFA04-007, February 20, 2004.

⁹ *Economic Indicators*, May 2004, Washington, D.C., U.S. Government Printing Office, p 12.

¹⁰ The U.S. is divided into 5 Petroleum Administration for Defense Districts (PAD Districts). District 1, East Coast, District 2, Midwest, District 3, Gulf Coast, District 4, Rocky Mountain, and District 5, West Coast. PAD District 1 is broken into three subdivisions: PAD District 1A, New England, PAD District 1B, Central Atlantic, and PAD District 1C, Lower Atlantic.

PAD District 1C (Lower Atlantic); sales in PAD District 2 increased by 40.2 million gallons and PAD District 4 increased by 0.9 million gallons. Winter conditions in PAD District 3 (Gulf Coast) and PAD District 5 (West Coast) were warmer than normal, consequently sales of distillate to the residential market dropped. Sales in PAD District 3 fell by 2.0 million gallons and by 23.3 million gallons in PAD District 5.

Sales to the commercial sector increased in PAD Districts 1 and 3 but declined elsewhere. The largest increases, reflecting the harsh winter, occurred in PAD District 1A where sales were up by 200.0 million gallons, PAD District 1B where sales increased by 190.4 million gallons, and PAD District 3 where sales increased by 53.5 million gallons. Sales fell the most in the West Coast region dropping by 73.0 million gallons. The very large increases in the New England and Central Atlantic regions of PAD District 1, not only reflect the harsh winter conditions but also resulted in part from a temporary change in fuel use dynamics where fuel switching in the region took some sales away from natural gas which had been gaining market share in the commercial sector in recent years.¹¹

In 2003, sales of distillate to the industrial sector were generally down on a regional basis. Sales increased only in PAD District 1A, New England, and PAD District 3, the Gulf Coast. The increase in New England in particular reflected the ability of a substantial number of industrial consumers in the region to fuel switch. Sales elsewhere fell reflecting a general decline in industrial activity; total energy consumption by the industrial sector dipped slightly by 0.8 percent.¹² Very high natural gas prices led to the closure of some industrial facilities especially during the first half of the year as the amount of natural gas in storage reached an all-time low that led to concern about the ability of the industry to refill storage in time for the following winter. However, by August, some of the concern had moderated and much of the fuel switching had abated as well.¹³ For the year, sales increased by 56.1 million gallons in PAD District 1A, declined by 8.0 million gallons in PAD District 1B, and declined by 1.7 million gallons in PAD District 1C. Sales increased by 79.8 million gallons in PAD District 3 but declined by 50.5 million gallons in PAD District 2, declined 7.6 million gallons in PAD District 4 and declined 58.0 million gallons in PAD District 5.

Sales to the military increased by 58.3 million gallons (16.3 percent). Sales were up generally throughout the country with the exception of PAD District 1A (New England), and the West Coast, the region most removed from the theater of action in the war with Iraq.

Boosted by fuel switching and the operation of peaking facilities, distillate sales to the electric power sector surged, increasing by 397.1 million gallons (52.9 percent). On a regional basis, sales increased throughout the country without exception; the largest increases occurred in the Lower Atlantic portion of PAD District 1 where sales increased by 138.8 million gallons (66.9 percent) and in PAD District 3, the Gulf Coast where sales more than doubled, increasing by 93.2 million gallons (127.6 percent).

Residual Fuel Oil

Natural gas prices typically increase with the approach of winter, however, during the winter of 2002-2003, natural gas prices surged to record levels as the winter weather proved to be far colder than normal particularly in the Northeast and stocks of natural gas reached record low levels as the winter progressed. As a consequence of the unusually high prices for natural gas, consumers with the ability to switch from gas to oil did so in large numbers and sales of residual fuel oil surged; total sales of residual fuel oil increased by nearly 1.1 billion gallons (10.1 percent). The largest increase by far occurred in the sales to the electric power sector where sales increases, driven primarily by fuel switching, surged by 1.7 billion gallons (47.5 percent) over the level of sales in 2002. Also boosted by fuel switching, sales to commercial sector increased by 183.4 million gallons (32.1 percent), and sales to the industrial sector increased by 163.4 million gallons (13.1 percent).

When viewed in the aggregate, the overall increase in residual fuel oil sales more closely resembles the increase in sales during 2001 rather than that sharp drop in sales that occurred in 2002 or the long-term trend toward lower sales typical of the past several years. In 2001 and 2003 similar conditions including a cold winter coupled with unusually high gas prices prevailed and in both years led to significant amounts of fuel switching. In 2002, more moderate natural gas

¹¹Some large commercial users (particularly institutional consumers) have the ability to fuel switch.

¹²EIA, *Monthly Energy Review*, May 2004, Table 2.1.

¹³Oil Daily, issues of April 7, 2004, p7, May 28, 2004, p5, and August 4, 2004, p5.

prices and a more typical relationship; between natural gas and fuel oil provided no incentive for those with the ability to switch fuels to move away from gas to oil.

Consequently, the very substantial increases in 2001 and 2003 should not be seen as a contradiction to the long-term trends of declining sales and production of heavy fuel oil. Rather, in 2003 as in 2001 very cold winter weather, tight gas supplies and very high gas prices provided the opportunity for large customers to switch from gas to fuel oil whenever possible. In addition, in 2003, unusually high prices for natural gas later in the year provided the incentive for customers to fuel switch during the late spring and into the summer as well. A close examination of electric power production during 2003 compared on a month-to-month basis with 2002 reveals that with the exception of January 2003, less natural gas was used in the generation of electric power in each month than was the case during the previous year.

With an increase of 183.9 million gallons (32.1 percent), sales of residual fuel oil to the commercial sector reached a total of nearly 756 million gallons, the highest volume since 1997. Sales were up throughout the country with the exception of PAD District 5, the West Coast. Reflecting both the colder than normal winter and fuel switching, the largest increases were in the Central Atlantic up 94.7 million gallons (21.9 percent) and New England up 61.7 million gallons (69.7 percent).

Sales to the military more than doubled increasing by 6.4 million gallons (164.0 percent). With the exception of PAD District 1A, sales increased throughout the country.¹⁴

Although overall sales of residual fuel oil increased in 2003, not all sectors experienced increased sales. Neither the small drop of 1.9 million gallons of miscellaneous sales nor the drop of 24.6 million in sales to oil company use (22.6 percent) were significant, however, not even the massive drop of 973.8 million gallons (20.1 percent) in the bunker market was large enough to emerge from the shadow of the combined increases in the electric power, commercial and industrial sectors.

Sales of bunker fuel plunged, since higher prices in the United States compared with other major markets

such as Rotterdam and Singapore led many shippers to forego refueling while in a US port. Sales of bunker fuel fell in all regions of the country and in each of the three districts of PAD District 1. Sales fell the most in PAD District 5, which includes California, where an exemption on payment of sales tax on bunker fuel expired on January 1, 2003 and consequently, ships found it significantly cheaper to fill their tanks elsewhere to avoid the tax. Bunker sales in PAD District 5 fell 377.7 million gallons (27.8 percent). Although the special circumstances in California exacerbated the impact of high domestic prices, substantial drops in sales of bunker fuel also occurred in Pad District 3 by 140.4 million gallons, PAD District 1B by 144.3 million gallons, and PAD District 1C by 246.2 million gallons.

Rather than a turnaround in the decline of heavy fuel, weather and increased volatility in the natural gas market are now central to the fortunes of the residual fuel oil market in any given year. Whenever weather and high prices for competing fuels provide the incentive for fuel switching, larger customers in the industrial, commercial and especially the electric power sectors will take advantage of the situation and switch to oil. The long-term trend toward lower sales of residual fuel remains and continues to affect the market; it reflects factors within in the energy sector and externalities as well. The principle reasons for the changing relationship are: changing crude oil specifications; enhanced refinery sophistication resulting in increased production of gasoline and distillate at the expense of production of heavier products such as residual fuel oil, environmental constraints and restrictions on fuel oil use, and the availability of abundant relatively inexpensive natural gas have contributed to a diminished use of residual fuel oil in the production of electric power.¹⁵ For residual fuel oil, although the overall trend is down, significant fluctuations in the amount of fuel sold will occur whenever price differentials make switching attractive and whenever interruptible gas contracts take effect during the coldest winter periods.

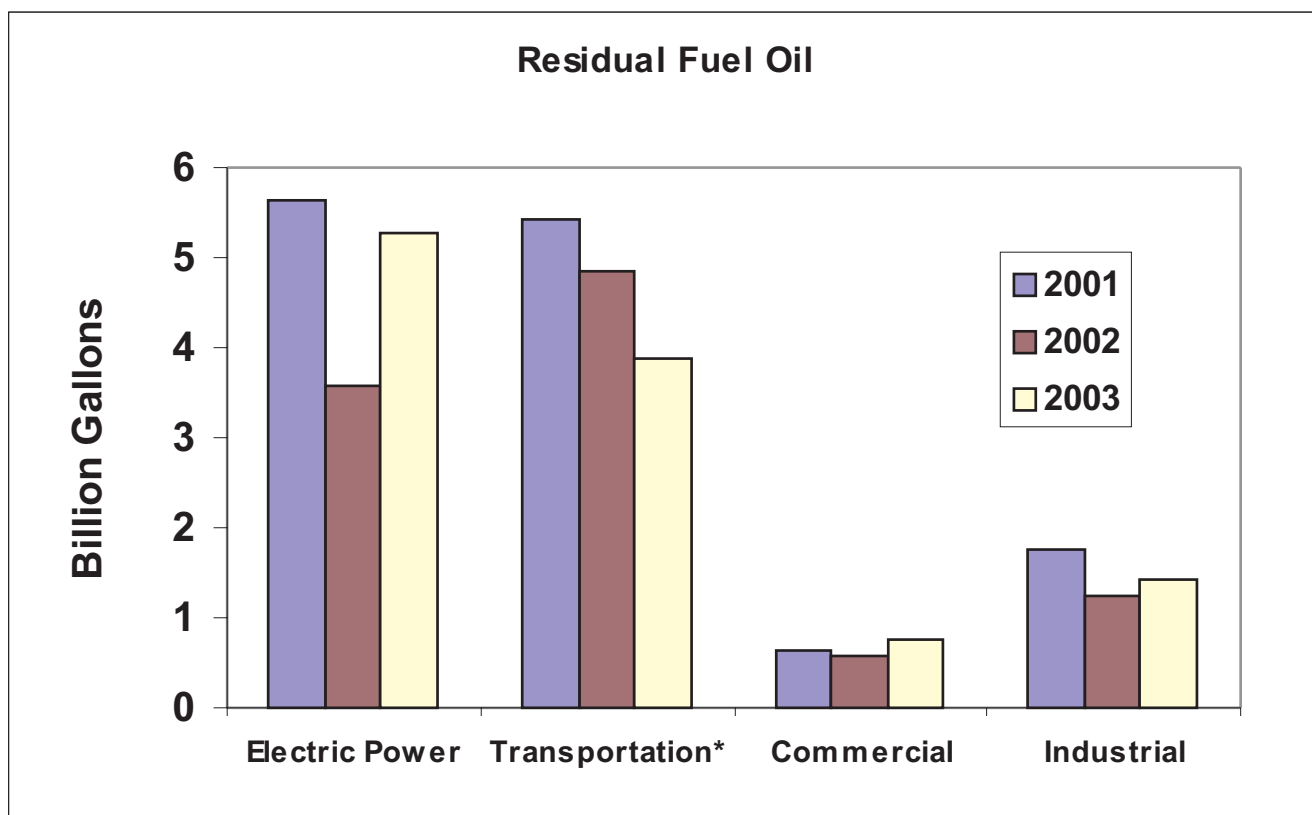
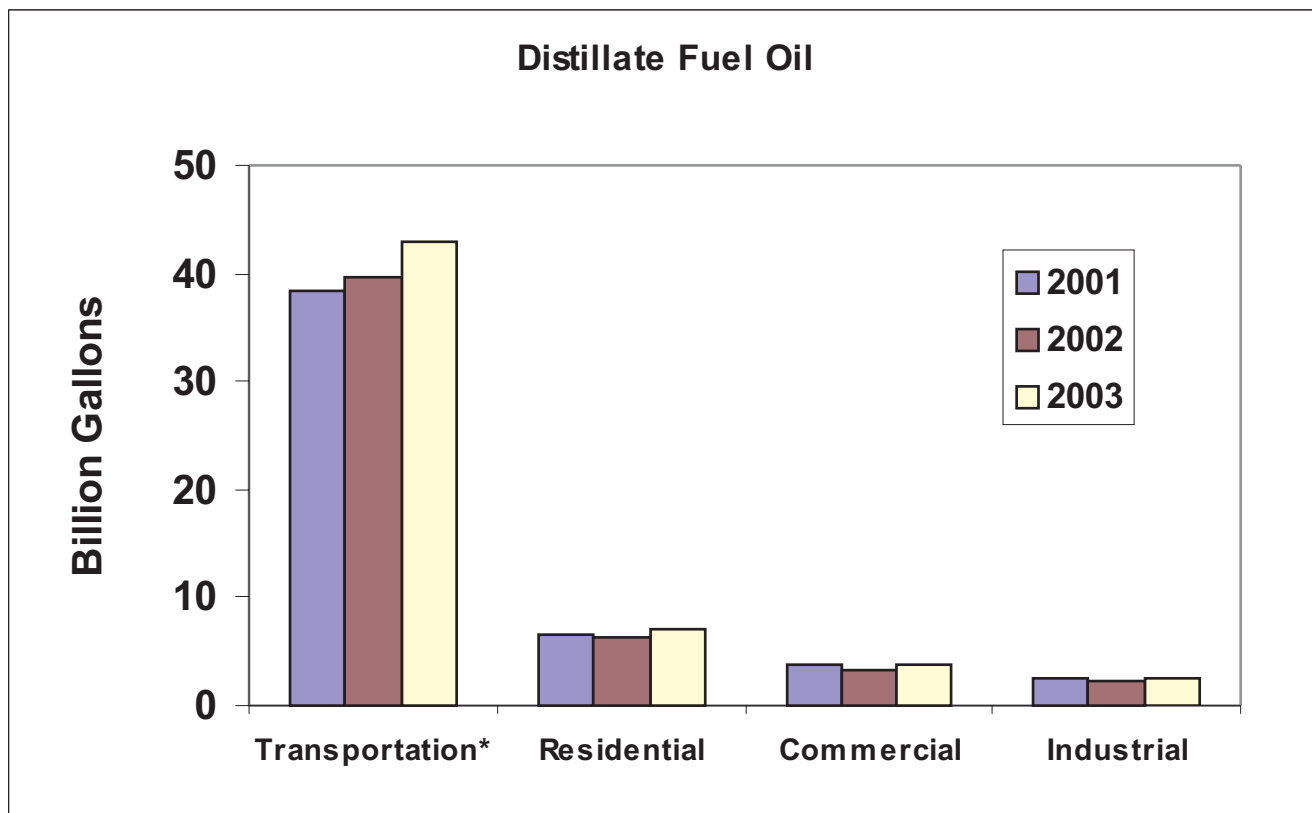
Kerosene

Sales of kerosene increased by 173.2 million gallons (26.1 percent). Aside from the farm sector, sales increased in all consuming sectors. The largest increases took place in the residential and industrial sectors where sales increased by 76.9 million gallons and 86.9 million gallons respectively.

¹⁴No sales of residual fuel to the military were recorded in PAD District 3 or 4 in either 2001 or 2002.

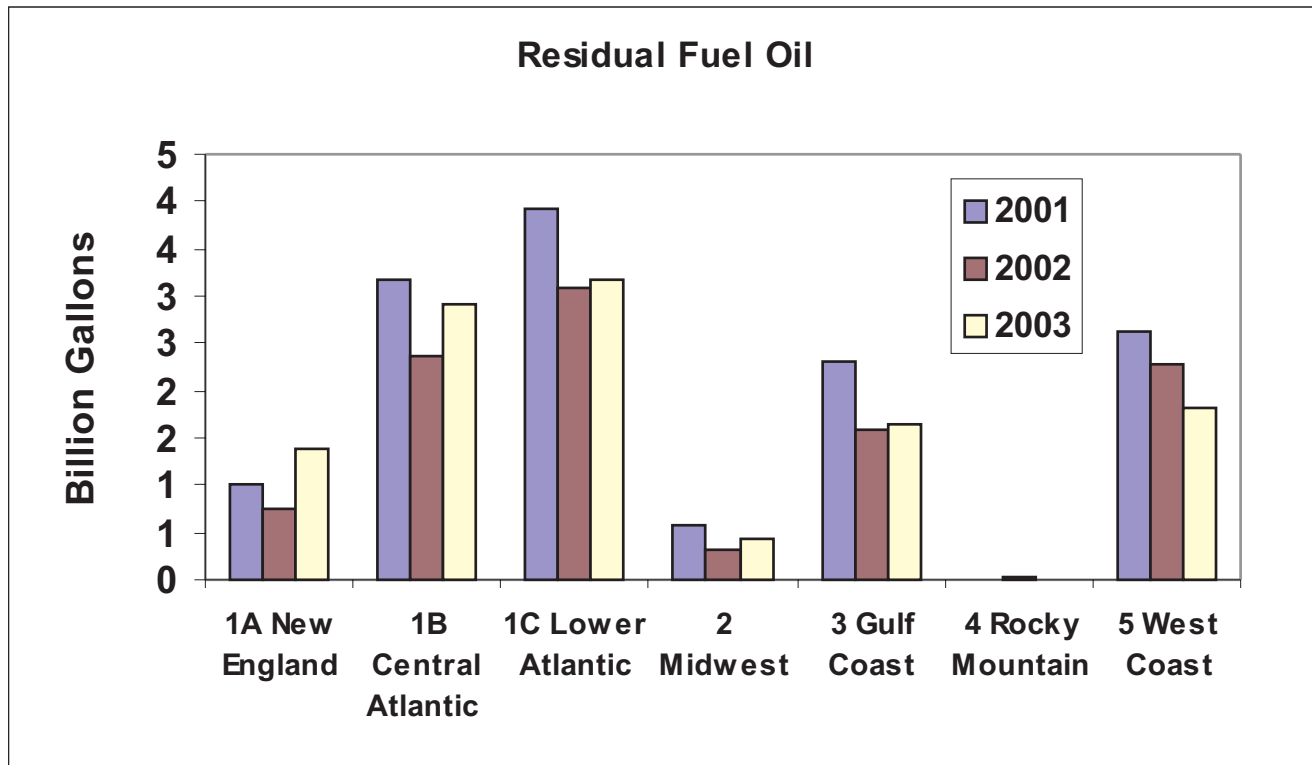
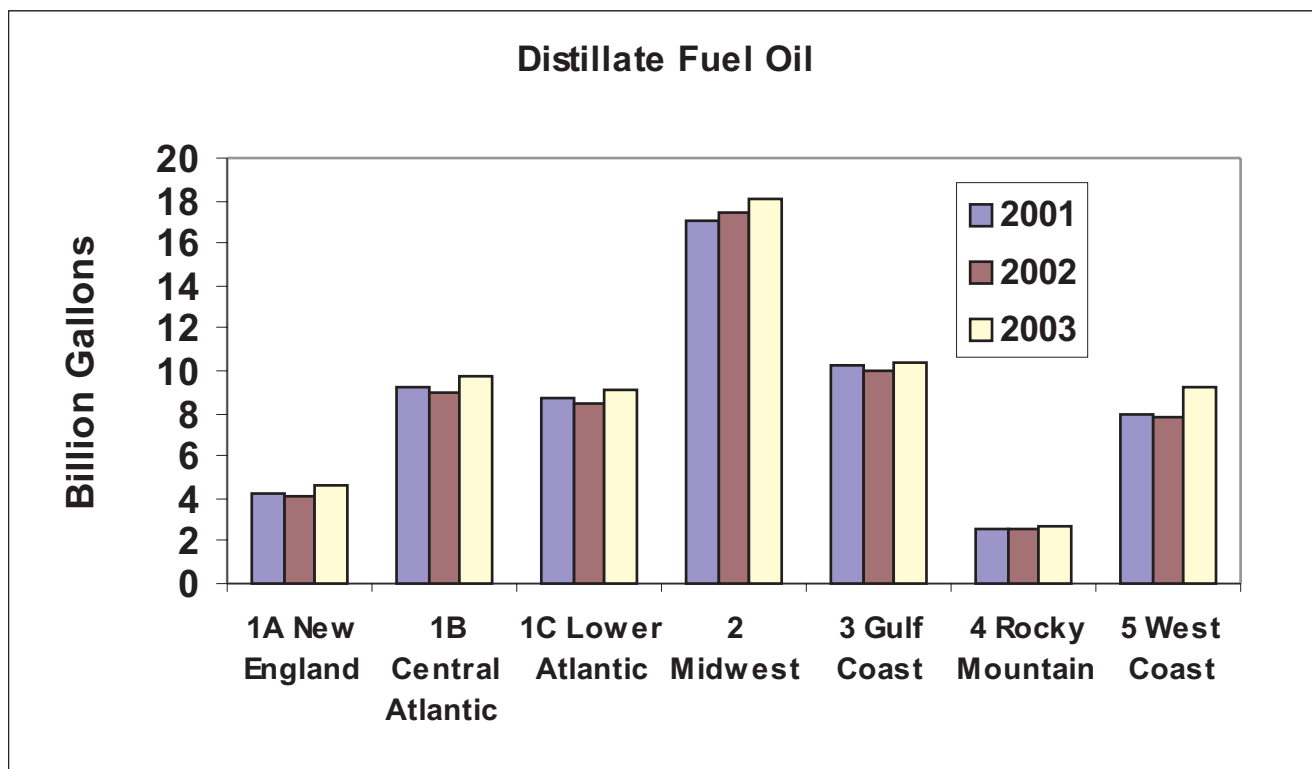
¹⁵It should be noted that the ability to increase production of light higher value products does not typically mean that refineries with upgraded processing capacity no longer possess the ability to produce heavier products such as residual fuel; rather, the economics involved dictate the production of the higher value products. Due to the divestiture of many electric power generation facilities, changes in fuel use and plant operations also contributed to the decline of residual fuel oil. For example, operators of these merchant plants blend fuels to achieve greater efficiency and to lower emissions of dirtier fuels (oil blended with natural gas and even oil and coal). When it is advantageous, the operators also may purchase power and re-sell the fuel, rather than generate electricity.

Figure HL1. U.S. Sales of Distillate and Residual Fuel Oils by Energy Use, 2001-2003



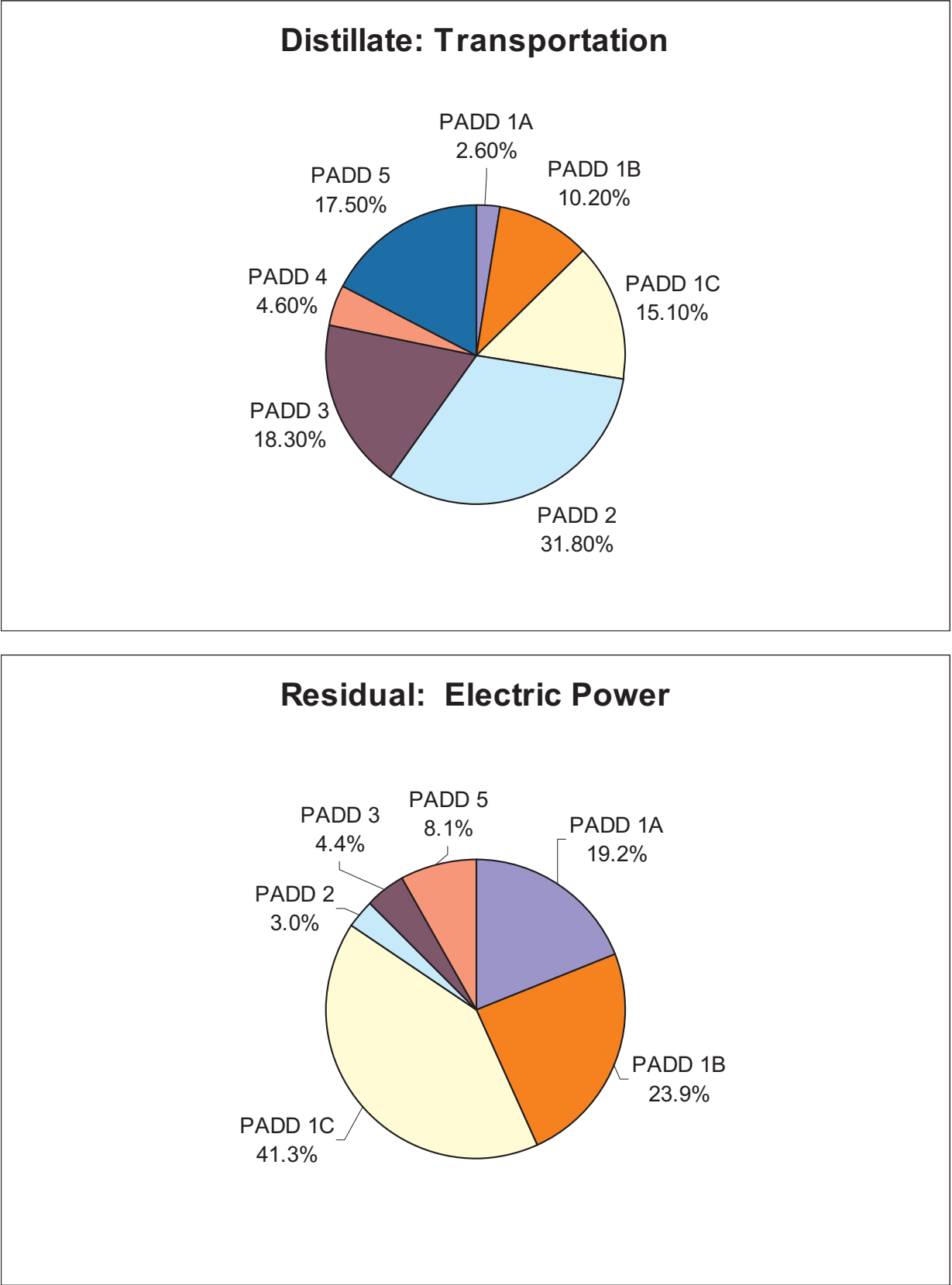
*For distillate fuel oil, transportation use comprises railroad, vessel bunkering, and on-highway diesel energy use categories. For residual fuel oil, transportation use comprises the vessel bunkering energy use category.
 Sources: Energy Information Administration, Form EIA-821, "Fuel Oil and Kerosene Sales Report," 2001 and 2002.

Figure HL2. Volume Distribution of Distillate and Residual Fuel Oils by PAD District, 2001 - 2003



*Residual fuel oil sales in PAD District IV are too small to appear in this graph.
 Sources: Energy Information Administration, Form EIA-821, "Fuel Oil and Kerosene Sales Report," 2001 and 2002.

Figure HL3. Distillate and Residual Fuel Oil Sales for Selected Energy Use Categories by PAD District, 2003



Sources: Energy Information Administration, Form EIA-821, "Fuel Oil and Kerosene Sales Report," 2003.